



## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

REC'D 25 JAN 2005

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Applicant's or agent's file reference PU02118-PCT		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/14946	International filing date (day/month/year) 29.12.2003	Priority date (day/month/year) 30.12.2002	
International Patent Classification (IPC) or both national classification and IPC G01N30/60			
Applicant AMERSHAM BIOSCIENCES AB et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 1 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand  02.07.2004		Date of completion of this report  21.01.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer  Müller, T  Telephone No. +49 89 2399-2285 	

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/14946

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

### Description, Pages

1-5 as originally filed

### Claims, Numbers

1-5 received on 10.01.2005 with letter of 10.01.2005

### Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-5
	No: Claims	
Inventive step (IS)	Yes: Claims	1-5
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-5
	No: Claims	

2. Citations and explanations

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

Reference is made to the following documents:

D1: US-A-5 169 522 (SHALON TADMOR ET AL) 8 December 1992 (1992-12-08)

D2: US-A-3 747 479 (NIGHTINGALE D ET AL) 24 July 1973 (1973-07-24)

D3: US-A-4 804 290 (BALSELLS PETER J) 14 February 1989 (1989-02-14)

**Novelty**

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and shows (the references in parentheses applying to this document):

A column slurry packing compressor, comprising piston (200) and L shaped scraper (370) for a chromatography column (100), the piston (200) having first and second end faces (336, 338), first and second annular grooves (340, 350) with an O-ring (342) therein and a through hole (see figure 1 and the corresponding description).

The subject-matter of claim 1 differs from this known piston and scraper assembly in the characterising features of claim 1.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

**Inventive step**

The problem to be solved by the present invention may be regarded as ensuring a tight fit of the scraper in the chromatography column and to prevent liquids in the column from coming into contact with the sealing O-rings.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT). Documents D2 and D3 of the search report disclose the problem of sealing a piston and the structural features of the characterising portion of claim 1: D2 discloses a piston member comprising an L-shaped PTFE sheath (71) that is a scraper. The internal surface of the sheath is provided with an annular groove (78), and an O-ring (74), see figure 7 and the corresponding description on column 7, line 58 - column 8, line 33. Similarly, D3 discloses a cylindrical core (100), that is a piston with first and second circumferential grooves (104, 106) with a seal member (82)

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having first and second grooves for accommodating a first and a second spring (94,96) that is biasing means. However, D2 and D3 are related to a piston for syringes and stopcocks and to a latching and sealing device in a syringe or plunger pump respectively. No hint is given in D1, which relates to a chromatography column, to look at piston and scraper assemblies per se, as disclosed in D2 and D3, or to combine the features of these documents with the teaching of D1.

**Dependent claims:**

Claims 2-5 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

## Claims

1. Piston and scraper assembly (26, 26') for a chromatography column, comprising a piston (5) and a scraper (25) wherein said piston (5) has a front, first face (7) a cylindrical portion (17), and a second, rear face (15), and a through hole (11) connecting said first face (7) to said second face (15), and is provided with an annular groove (23, 23') of depth D1 mm in the cylindrical portion (17), and wherein the scraper (25) is a ring, adapted to fit onto piston (5), with an L-shaped cross-section and having a complementary groove (39) of depth D2 mm in an inner face (37), characterised in that said annular groove (23, 23') is provided with a resilient sealing, locking and biasing means (45) which extends from said annular groove (23, 23') into said complementary groove (39) in order to retain said scraper (25) on said piston (5).
2. Piston and scraper assembly in accordance with claim 1 characterised in that said piston is provided with a further annular groove (21) containing a sealing means (43).
3. Piston and scraper assembly in accordance with any of the previous claims characterised in that said resilient sealing, locking and biasing means (45) is a sealing-ring with a thickness which is greater than  $D1 + D2$  mm.
4. Piston and scraper assembly in accordance with any of claims 2-3 characterised in that said further annular groove (21) is closer than said annular groove (23, 23') to the first, front face of piston (5).
5. Piston and scraper assembly in accordance with any of the previous claims characterised in that said scraper is made of a polymer material.